Before we begin, are there any questions from last day's work?

Today's Learning Goal(s):

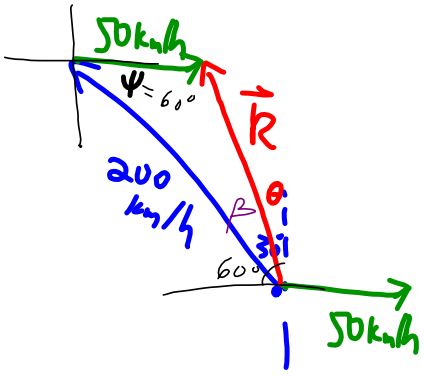
By the end of the class, I will be able to:

a) solve various vector addition and subtraction problems using a variety of methods
b) create and solve a vector addition or subtraction problem

5.10.1: Vector Addition and Subtraction Problems

Date: May 10/17

Ex. An airplane is flying at a heading of N30°W at a constant speed of 200 km/h. If the wind is blowing at constant speed of 50 km/h east, what is the actual speed and direction of the airplane with respect to the ground?



$|\vec{R}| = \sqrt{200^2 + 50^2 - 2(200)(50)\cos 60^\circ}$

$\doteq 180.2775$

$\doteq 180.278$ km/h

$\frac{\sin\beta}{50} \doteq \frac{\sin 60^\circ}{180.278}$

$\beta \doteq \sin^{-1}\left(50 \times \frac{\sin 60^\circ}{180.278}\right)$

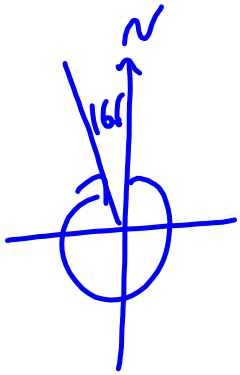
$\doteq 13.897$

$\doteq 13.90$

$\theta \doteq 30^\circ - \beta$

$\doteq 30^\circ - 13.90^\circ$

$\doteq 16.10^\circ$



∴ the plane's speed and direction are 180.278 km/h N16.10° W.

or bearing 343.9°

180.278 km/h [N16.10° W]

5.10.1: So What's Your Problem?

Date: May 10/17

Problem 1:

A canoeist is travelling south across a river to her campsite with a velocity of 2 m/s. The current in the river is moving east at a velocity of 5 m/s and is carrying the canoeist down the river.

What is the actual velocity of the canoe?

Ryan

∴ The canoeist is going 5.385 m/s at a bearing of 111.80° or E21.80°S

Problem 2:

In order to widen a road, a tree stump needs to be removed. Two backhoes are brought to the site. One backhoe pulls with a force of 2500 N east while the second backhoe pulls with a force of 3000 N northeast.

What is the resultant force and its angle with respect to the first backhoe?

Kayla ∴ The backhoes pull a resultant force of 5084.939 N bearing 65.35°. (E24.65°N)

Problem 3:

A light airplane is travelling at a speed of 150km/h with a heading N50°W. A 20km/h wind is blowing due south onto the airplane.

What is the ground speed of the airplane?

Wes

∴ The planes speed and direction are 137.997 Km/h and N56.37 W

Problem 4:

The Leadership Club has decided to go cross-country skiing and the group has decided to stop at a rest cabin located on the trail. What is the displacement from the parking lot to the rest cabin, if they skied 3 km west, 2 km northwest, 3 km east and 4 km north to get to the cabin?

Jake H.

∴ they will need to travel 5.596km going N75.37°W

5.10.2: So What's YOUR Problem?

Due Date: _____

Now it's your turn! Your group is to create a problem that can be modelled by vectors. Be creative!

Due tomorrow: A word document with your group question typed neatly.
Don't forget to include all group member's names.

Criteria for the presentation:

- A written problem with the necessary information.
- A vector diagram used to model the problem (including an appropriate scale and accurate angle measures).
- A solution to the problem using the components of the vectors, or the parallelogram law
- A comment on the reasonableness of your solution.
- A concluding statement.

Ensure that all group members have roles in the presentation of your problem.
Use mathematical language and reference to vector concepts in your presentation.
You may want to access the internet for ideas and reasonable magnitudes for velocity, force and distance.
You will be using the smart board for presentation of the problem.

You will ALSO be submitting a written copy of your solution.

This will be due the day following your presentation, in case you need to make some corrections.

Evaluation Rubric

Your problem will be evaluated using the following rubric.

Achievement Category	Level R	Level 1	Level 2	Level 3	Level 4
Knowledge/ Understanding	No evidence	Shows a limited understanding of vectors	Shows some understanding of vectors	Shows an understanding of vectors	Shows a high degree of understanding of vectors
Application	No evidence	Shows limited connection between vectors and the context. The numbers used are not realistic to the context	Shows some connection between vectors and the context. The numbers used are somewhat realistic to the context	Shows a connection between vectors and the context. The numbers used are realistic to the context	Shows a strong connection between vectors and the context. The numbers used are realistic to the context
Communication	No evidence	Question and solution shows limited clarity	Question and solution shows some clarity	Question and solution shows clarity	Question and solution shows a high degree of clarity